amount of light absorbed as it passes through the fluid in the fluid line **6362** may be proportional to the length of the path between the emission assembly **6382** and the detection assembly **6364** as well as the concentration of the source component **6000** of interest. As the concentration detector **6360** keeps the path length constant, variation in the intensity of light received at the detection assembly **6364** should be due to changes in the composition of fluid within the fluid line **6362**. The path length may be greater than or equal to 2.5 inches, 3 inches, 4 inches or more.

[1279] The light emission assembly **6382** may include an LED and phototransistor. The LED may emit light at a frequency which is absorbed by the source component **6000** of interest. The absorbance may, for example, be due to molecular bond vibration and/or electron energy state promotion. The LED may be a UV/Vis producing LED. The UV/Vis wavelength may be selected to be at or near an absorbance peak (e.g. λ_{max}) for the source component **6000** of interest. The LED may emit light at a wavelength of 405 nm+/−40 nm for example. Preferably, the LED includes a non-diffusion lens. In some specific examples, the LED may be a VLMU3100 UV Emitter available from Vishay Semiconductors headquartered at Vishay Intertechnology, Inc. 63 Lancaster Avenue Malvern, Pa. 19355. A UV3TZ-405-15 UV emitter available from Bivar Inc. and headquartered in Irving, Calif. may also be used.

[1280] The phototransitor used in the emission assembly **6382** and the detector assembly **6384** may be the same and may be chosen based on the emission wavelength. The wavelength of maximum sensitivity may be chosen to be the same as or near the emission wavelength of the LED. Where the emitter is a UV/Vis emitter, the phototransitor may be sensitive to a spectral range corresponding to the UV/Vis range or between ~350 nm-950 nm. The phototransitors may, in some specific embodiments, be SFH 3310 Phototransistors available from OSRAM located at 28845 Cabot Drive Novi, Mich. 48377.

[1281] To help prevent a loss in optical signal due to diffraction at the bend regions **6386** of the fluid line **6362**, the channel **6368** may be formed to optimize the shape of the bend regions **6386** of the fluid line **6362**. When the fluid line **6362** is placed into the channel **6368** and retained by the retainer **6364**, the path of the channel **6368** may constrain the fluid line **6362** in a retained configuration. The retained configuration may force the bends regions **6386** of the fluid line **6362** to conform to a specific optimized geometry. The geometry which provides the best signal to noise ratio may be empirically determined.

[1282] The angle of the cavities **6380**A, B with respect to their termination point at the channel **6368** wall may also be at a detector irradiance optimizing angle which accounts for boundary behaviors (e.g. refraction) of emitted light in the pathway between the emitter **6382** and detector **6384**. The detector irradiance optimizing angle may be selected based on anticipated or empirically observed bending of the emitted light path. This angle may be chosen such that the bending redirects emitted light onto the detector **6384**. The angle of the cavity **6380**A, B for the emitter **6382** and detector **6384** may be the same or may differ depending on the embodiment.

[1283] FIG. **262** depicts an example plot **6390** depicting data **6392** collected from a YSI **2300** Glucose analyzer and data **6394** collected from an example concentration sensor **6360** similar to that described in relation to FIG. **261**. In the example plot **6390**, dialysate solutions including varying concentrations of dextrose were measured. Each data point on the plot **6390** was created from an average of several different data points collected for the same solution. As shown, the example concentration sensor **6360** detected about a 50 mV difference between a 1.5% and 2.5% dextrose solution. An about 135 mV difference was detected between a 2.5% and 4.25% dextrose solution. As would be appreciated by one skilled in the art, a curve fit could be employed to relate the mV reading of the example concentration sensor **6360** to the reference reading provided by the YSI **2300** analyzer.

[1284] While aspects of the disclosure have been described in conjunction with specific embodiments thereof, it is evident that many alternatives, modifications, and variations will be apparent to those skilled in the art. Accordingly, embodiments of the disclosure as set forth herein are intended to be illustrative, not limiting. Various changes may be made without departing from the spirit and scope of the disclosure.

1-145. (canceled)

146. A system for determining a characteristic correlated to a heightwise location of a component of interest relative to a pumping chamber of a fluid handling set, the system comprising;

- a pumping cassette including the pumping chamber and having at least a first fluid valve, and a second a fluid valve leading to a port connected to a fluid line coupled to the component of interest;
- a pressure distribution module having a control surface against which the pumping cassette is held, the pressure distribution module including at least one sensor configured to output data indicative of the pressure of the pumping chamber; and
- a controller configured to command the pressure distribution module to establish a path from the port to the pumping chamber, receive the data, and detect a feature profile in the data, the controller configured to predict the characteristic of the component of interest based on the feature profile and temporal data associated with the feature profile.

147. The system of claim **146**, wherein the controller is further configured to actuate one or more pneumatic valve of the pressure distribution module to apply pressure to the control surface and consequentially place the pumping chamber in an intermediary state between a fully filled and fully delivered state before establishing the path from the port to the pumping chamber.

148. The system of claim **147**, wherein the intermediate state is a state that allows for the detection of a maximum positive and maximum negative head height of about the same absolute value.

149. The system of claim **146**, wherein the controller is further configured to actuate one or more pneumatic valve of the pressure distribution module to apply pressure to the control surface and consequentially place the pumping chamber in a negative head height detection biased state before establishing the path from the port to the pumping chamber.

150. The system of claim **146**, wherein the controller is further configured to actuate one or more pneumatic valve of the pressure distribution module to apply pressure to the control surface and consequentially place the pumping